Rapid assessment of the long-term impact of the SMART approach

The case of the rope pump in Nicaragua

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Introduction

- **The rationale behind the evaluation**
- **The task**
- **The methodology applied**
- **Expert feedback**

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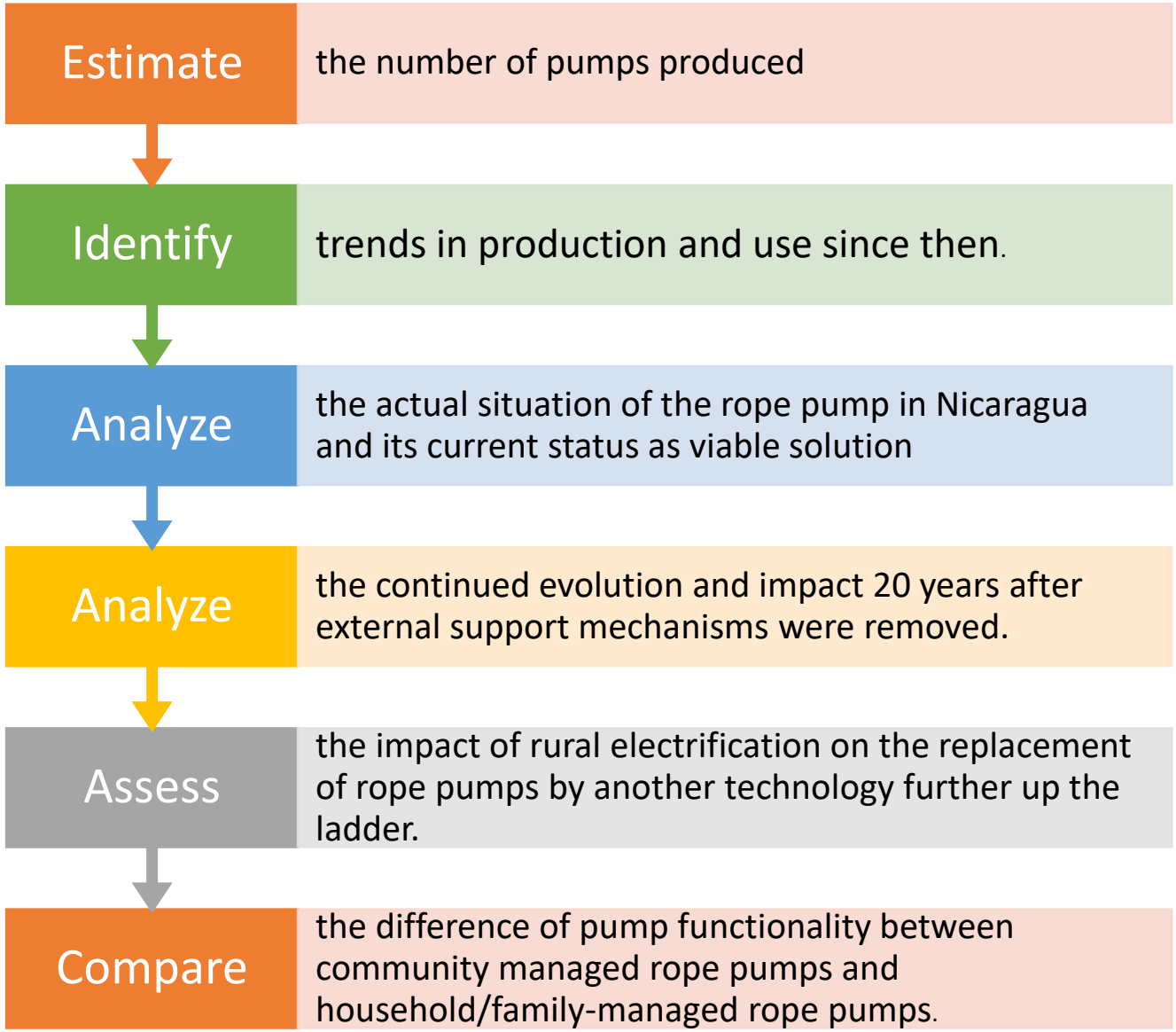
The task


Estimate
the number of pumps produced
Identify
trends in production and use since then.
Analyze
the actual situation of the rope pump in Nicaragua and its current status as viable solution
Analyze
the continued evolution and impact 20 years after external support mechanisms were removed.
Assess
the impact of rural electrification on the replacement of rope pumps by another technology further up the ladder.
Compare
the difference of pump functionality between community managed rope pumps and household/family-managed rope pumps.

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Background and personal motivations of the investigator

WASH Practitioner 1993 – present (mostly in Nicaragua)

urban / rural / peri urban

rural/gravity-fed spring source

indigenous-communal lands/ integrated WASH

rural/multiple technologies including rope pumps (2001)

clay pot filter (2004) Ron Rivera

self-supply/market-base

rainwater catchment

SMART approach (2011) Henk Holtslag

multiple sources Dan Smith

Technology Applicability Framework (TAF) Vinny Casey/Sean Furey

sector strengthening/Agenda for Change

service delivery models

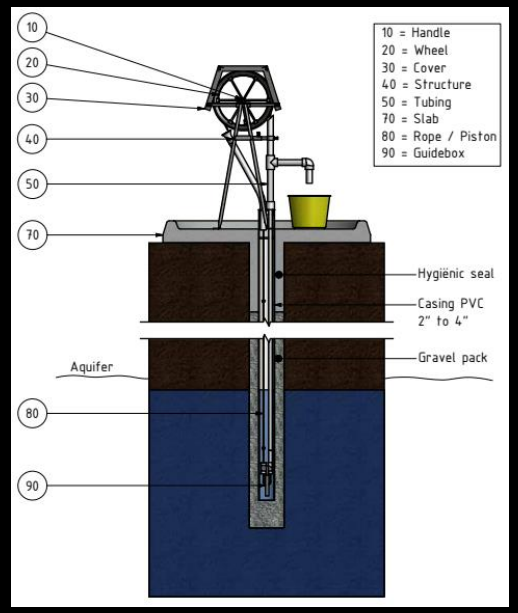
launch of the Nicaragua SMART Centre (2017)

Technology transfer of manual drilling and rope pumps to an extremely arid region of Colombia

Context

- Est. population 6.8 million
- 59% urban : 41% rural
- 2nd poorest country in Latin America and the Caribbean (LAC) Region
- HDI = 128 (medium)
- Inequality index = 26.7
- Water-rich 35,000m^3/ capita/yr
- Water supply:
  - Urban 91.% (65% in 2007)
  - Rural 55.4% (26.7% in 2007)

The rope pump: the definition of a SMARTech



- **Simple**
- **Market-based**
- **Affordable**
- **Repairable**
- **Technology (Transferable)**

The road travelled… the rope pump in Nicaragua

1980s

- Sandinista Revolution (July 1979)
- Agrarian reform / civil-war
- Rope pump introduced (1983 - 85) and developed as "alternative" technology In the context of agricultural reform

1990s

- Hurricane Joan (1988)
- Rope pump introduced by National Engineering University and Rural Water Supply Division in response to hurricane
- Significant investment phase ($2 million USD) for rope pump development based on local private sector

2000s

- Post-war expansion of the agricultural frontier
- Hurricane Mitch (1998)
- Surge in purchase of rope pumps for hurricane relief / reconstruction (nationwide)

2010s

- Hurricane Felix (2007)
- Increased rural electrification
- Surge in purchase of rope pumps for hurricane relief / reconstruction (Caribbean)

2020s

- Hurricanes Eta & Iota (2020)
- Launch of Nicaragua SMART Centre (2017)
- Brief surge in purchase of rope pumps for hurricane relief / reconstruction (Caribbean)

2022

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Introduction of the Technology

1983: initial introduction of the rope pump as an “alternative” or “popular” technology within the government-run Appropriate Technology Research Centre (CITA) which formed part of the Agrarian Reform Institute (INRA); CITA closed in 1985

1987: the development of the technology was transferred to the new national engineering university

1988: 200 pumps manufactured and provided to hurricane Joan relief effort

1990: first small private enterprise (BOMESA) was started for the production and marketing of rope pumps

Standard models

The most basic approach

Renewable Energy (Wind)

Elevating water

Innovation for increased capacity primarily for agricultural uses

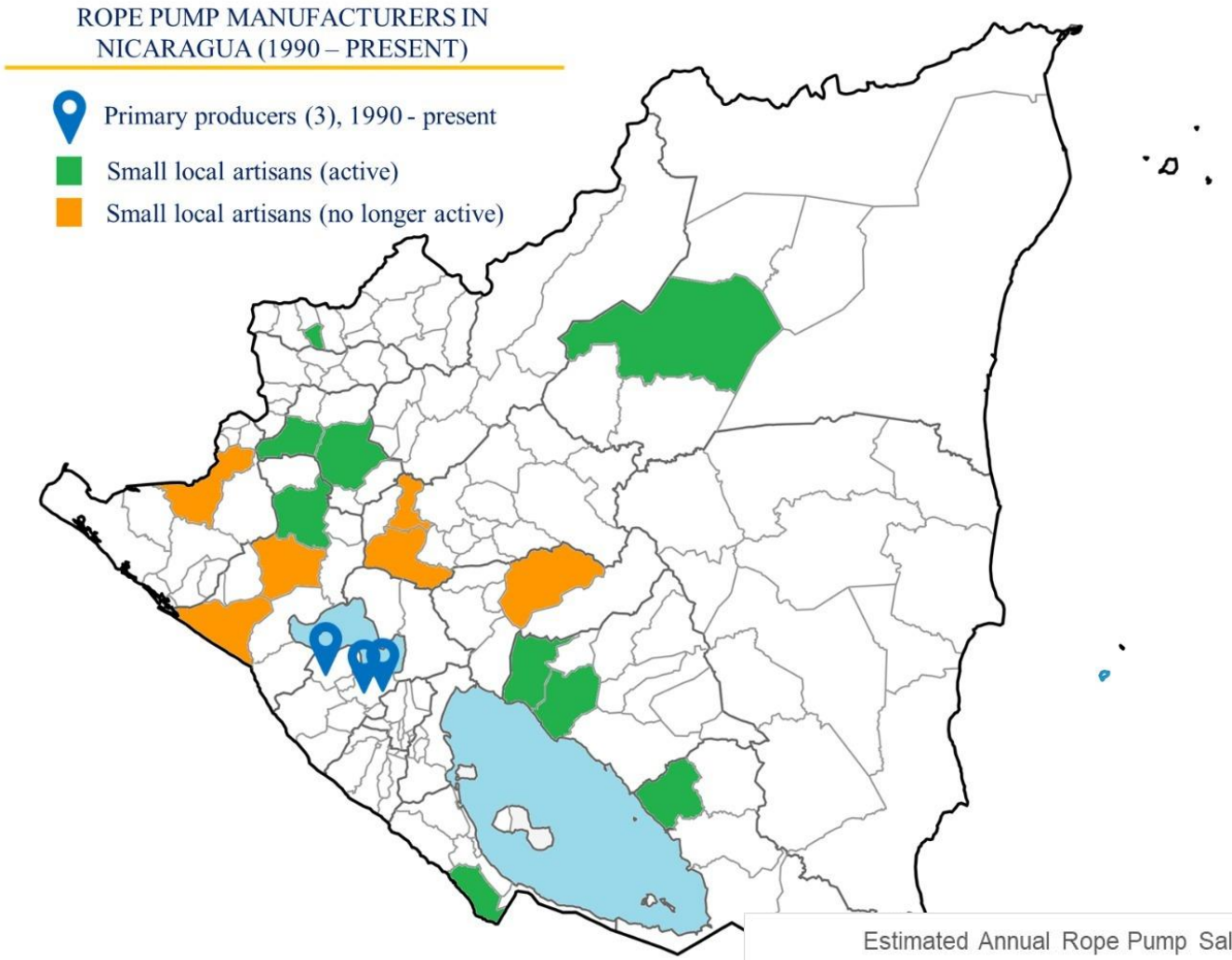
Acceleration / Scale-up 1990 - 1995

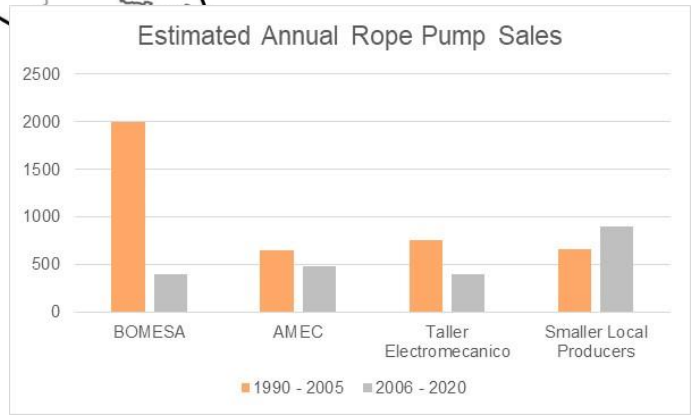
- significant investment in training, product development, promotion
- Technology transfer to local artisans
- Local industrial production of plastic pistons
- Reuse of locally manufactured ceramic electrical insulators

The numbers

- Family wells with **self-supplied rope pumps on premise** may account for as many as **50,000 households** including 3,000 in underserved small towns in the Caribbean Coast autonomous regions ➔ 14% of the households currently considered to be "without access" to communal water supply and 6.3% of rural access.
- 3,119 registered **communal wells** equipped with rope pumps of which **85% are functional**.
- **65% of municipalities** register the presence of rope pumps
- An estimated **87,722 rope pumps manufactured**: 84% by 3 primary rope pump manufacturers and 16% by as many as 19 local artisans

Rope pump manufacturers Sustainability and Evolution





Conclusions

Forty years after being introduced to Nicaragua, the rope pump continues to play a significant role in affordably improving access to water in rural and peri urban areas, particularly for dispersed settlements and rural farming families where the rapid expansion of rural electrification has yet to reach.

Conclusions

Impact on Access

The effect of the introduction of this low-cost technology and the long-term technical assistance (coaching) in production, quality control and marketing resulted in the fact that an estimated 450,000 people in Nicaragua have sustainable access to a basic water supply with a rope pump.

Conclusions

Social and Economic Impact Return on investment

The rope pump in Nicaragua can also be seen as an example of not only the social but also the economic impact that technical assistance in SMARTechs combined with an accelerated self-supply approach can have.

- **household wells with a pump increases yearly incomes of rural families on average with US$225,**
- **donor investment of $2 million USD in technical assistance (1990 – 5) can be translated to a consolidated increased income of $180 million USD for 50,000 rural families with rope pumps since 2005**

Conclusions

Market dynamics and subsidies

Different from what is often assumed, subsidizing rope pumps for (targeted) families did not distort the market but stimulated the sales to families who knew they would not get a subsidized pump

Conclusions

Challenges / Lessons learned (introduction, development and scaping up)

Long-term investment is required for technical assistance to iron out technical details, build local capacity to manufacture and build up the market, despite the apparent simplicity of the technology

The importance of a successful and adaptive marketing strategy, taking into account changing contexts

The need for the decentralization of skills and the local availability of spare parts to ensure timely repair and/or replacement

The need for government support for the technology

Conclusions

Competition and the ladder of service levels

The 3-year cost of a:

Rope pump is US$ 150

roughly US$120 in initial capital investment and $10 per year in maintenance)

Low cost electrical pump is US$ 230

US$50 in initial capital investment and $60 per year in electricity

Conclusions

The Challenge of Unrecognized Impact

The role of the rope pump as a family-scale self-supply technology, although accepted as a national standard pump for rural water supply, is still not widely recognized in the sector as contributing to the goal of universal water access (SDG 6.1) and water related SDGs for food and income. As such it is not explicitly considered in the national register of waterpoints, their conditions and functionality.

Conclusions

The Challenge of Identifying New Opportunities, New Business Models, and a Marketing and Distribution Strategy

Renewed efforts at marketing the rope pump and expanding its supply/distribution chain, in all of its applications, particularly in regions with limited levels of rural electrification and relatively shallow groundwater, could generate an interesting market opportunity if combined with other SMART solutions (water filters, solar-powered pumps, rainwater catchment, etc.).

In this sense the rope pump is not an end point but a valuable step leading to a natural progression of improved access.

What's next for the rope pump in Nicaragua?

- Explore underserved markets (Caribbean region)
- Complement with other low-cost pumping options (low-capacity solar pumps) and other SMART solutions (household filters)
- Revitalize production, distribution, marketing, financing and technical support strategy
- Lobby for the inclusion of family systems (self-supply) in national monitoring programs.

Thank you!

- Questions
- Reflections

1990 - WASH Practitioner
1993 – 95 urban
1996 - rural/gravity-fed spring source (Gilles Corcos)
1999 - indigenous-communal lands/ integrated WASH
2001 - rural/multiple technologies incl. rope pump
2004 - clay pot filter (Ron Rivera)
2008 - self-supply/market-based
2007 - rainwater catchment
2011 - SMART approach (Henk Holtslag)
multiple sources (Dan Smith)
Technology Applicability Framework (Vinny Casey)
sector strengthening
service delivery models
2017 - launch of the Nicaragua SMART Centre

Background and personal motivations of the investigator

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Soluciones a tu alcance

The role of key stakeholders:

- Cooperation for Development agencies – technical assistance
- Government
- Local private sector (manufacturers)
- International NGOs – implementers
- Small-scale farmers